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Complete report of the Board of Health a

Presented to the City Council

COMPLETE
REPORT

OF THE

BOARD OF HEALTH,

AND

BOARD OF CONSULTING PHYSICIANS,

AS PRESENTED TO THE CITY COUNCIL,
DECEMBER 12TH, 1871.

TO WHICH IS ANNEXED

INSTRUCTIONS FOR CONTROLLING SMALL-POX CONTAGION,
ADOPTED BY THE BOARD OF HEALTH OF THE
CITY OF LOWELL, MASS.



LOWELL, MASS.:

STONE & HUSE, BOOK AND JOB PRINTERS, 21 CENTRAL STREET.
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LOWELL, MASS., 13th December, 1871.

To the City Council :

The Board of Health, to whom was re-committed their Report of the 28th ult., with a request to amend, by striking out the following, to wit:—

“The motives which induced the City Government to elect the Board of Health, as at present constituted, were well understood by its newly-elected members and by the public generally, and were, we are constrained to say, not such as to inspire the utmost confidence in the sincerity of the choice then made”—

“The ruling of the Mayor, that we should be obliged to serve or vacate our seats as members of the City Council, we ascertained and knew to be wholly erroneous”—

“And many lives were being sacrificed”—

Have given a candid consideration to the same, and report:

That they find the statements correct, and essential to a full exposition of accepted facts; that they are necessary to a complete record; that they tend to show under what circumstances this Board of Health was chosen; how its members were threatened with expulsion from the City Council, if they declined to serve; that the ruling sought to be imposed was erroneous; and why, finally, under the pressing exigencies of a great public calamity, in connection with other facts stated in the Report, the Board consented to serve. The Report is couched in respectful language, gives the facts in mild and unexceptionable terms, while in our opinion they would justify severe comment. Therefore, the Board of Health respectfully decline to accede to this request, or make any change in their Report, and herewith return the same as originally presented.

Respectfully submitted.

FREDERICK AYER,	} Board of Health.
HENRY C. HOWE,	
BENJ. WALKER,	
H. C. CHURCH,	
ABEL T. ATHERTON,	

W.A.S. 13th Dec. 1871

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REPORT OF BOARD OF HEALTH.

To the City Council:

The special business for which the present Board of Health was elected in September having been, as is believed, mainly completed, and indulging in the opinion that the experience gained in the suppression and eradication of the small-pox from our city, may become valuable in future, and perhaps interesting at the present time, it would seem to be due to the City Council and the public that a statement of the facts connected therewith should be made.

The Board of Health, therefore, submit the following report:

The epidemic known as small-pox commenced in January last, and began early in the summer to attract the serious attention of our citizens, amounting to an alarm as it spread through the different localities in our city.

Many left the city; people from surrounding towns were deterred from coming here with their products and for business purposes, and the commercial and other business enterprises of our city became almost paralyzed.

Through a variety of reasons to which it is now only necessary to advert, the old Board of Health resigned on the 15th of September, and the new one was elected. The motives which induced the City Government to elect the Board of Health, as at present constituted, were well understood by its newly-elected members and by the public generally, and were, we are constrained to say, not such as to inspire the utmost confidence in the sincerity of the choice then made.

The ruling of the Mayor that "we should be obliged to serve or vacate our seats as members of the City Council," we ascertained and knew to be wholly erroneous.

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At a time when the epidemic was raging to an alarming extent, and many lives were being sacrificed, we found ourselves declared the Board of Health,—thus having imposed upon us onerous duties and a grave responsibility, against our will and most earnest protest.

This condition of affairs induced us to examine carefully the official situation into which we had been forced, our duty to the public and the cause of humanity, and we could not escape the conviction that it was due to the citizens of Lowell that prompt and efficient action should be immediately instituted; and being fully satisfied that we were invested with ample powers under the law, we determined to accept the office and undertake the extermination of the disease from our city, and accordingly organized for that purpose on the 18th day of September, by the choice of Abel T. Atherton, Secretary—Frederick Ayer having been elected Chairman by the City Council.

With the least possible delay, the Board of Health called to their counsel and assistance Doctors John W. Graves, Gilman Kimball, Nathan Allen, Walter Burnham, Hiram Parker, Francis C. Plunkett, and John H. Gilman—who organized by the choice of Dr. John W. Graves, Chairman, and Dr. John H. Gilman, Secretary, and were styled the Board of Consulting Physicians. Under their direction twelve other physicians entered upon the work of vaccination, each having a certain section of the city assigned to him.

The work of isolation was commenced immediately by removing as many of the most exposed cases as the hospital would accommodate, and by placing signals and police to prevent communication with each remaining case.

It became evident that complete isolation in the streets of our city was next to impossible, and additional hospital accommodations were provided, when all existing cases, that were movable, were removed, and all new cases were removed as soon as reported.

The removal or dismissal of each case was followed by the destruction of material, and most thorough fumigation of persons and premises.

At first there was much opposition on the part of patients and members of their families to being removed to the hospital, and in quite a number of instances it became necessary to resort to legal measures, for the public safety; but when the City Hospital was transferred by the Overseers of the Poor to the Board of Health, the services of a resident physician at the hospital having been secured

in the person of Dr. A. W. Buttrick, who proved well qualified for the position, and several Sisters of Charity having volunteered their services as nurses, the devotion of whom to the sick was only equalled by their disinterested kindness to all under their care, these objections were almost wholly removed, and through the influence of physicians, removals were made without much further difficulty. In fact, after the management and treatment at the hospital became known, patients were anxious to be taken there, and not oversolicitous to leave, after they were discharged.

Two cases have been prosecuted and fined for concealment, and four cases for refusing to be vaccinated. This determined action greatly expedited the work of the vaccinating physicians, and enabled them to make it much more complete.

Since the organization of our Board, on the 18th of September, there have been reported 221 cases of varioloid and small-pox.

The greatest number of patients at the hospitals at any one time was 108. To-day there are 4 patients in the City Hospital, and none in the Corporation Hospital. The last case was reported on the 24th instant.

Meetings of the Board of Health and of the Board of Consulting Physicians were held with much frequency during the first weeks of their organization, and until the epidemic had subsided, and both Boards were characterized with great unanimity of action, which fact, we think, sufficiently indicates their one-fold purpose.

The wagon and bedding used for conveying patients were thoroughly fumigated after each trip, and before they were returned to the city. A smoke-house was established adjoining the Board of Health office, in which physicians and all other persons known to have been handling patients, or visiting infected places, were required to be fumigated, to prevent exposure to other people. In fact, every precaution that could be suggested to prevent the spread of the disease was adopted and enforced.

The result of this concentrated action is shown in the complete extermination of the epidemic and an almost entire eradication of the disease, and in short, is due,

1st. To the prompt report of cases and suspected cases to the Board.

2nd. To the removal and isolation of all cases as soon as reported.

3rd. To the immediate destruction or thorough fumigation of all infected material, and the thorough fumigation of all infected persons and premises.

4th. To every other precautionary measure, to prevent the spread of the disease, that could be devised; and

5th. To vaccination.

The working force has been gradually reduced until there are now employed only three persons to care for the few patients remaining at the hospital, and to continue the organization needful for the prompt removal of those scattering cases which it is probable may occasionally appear.

By vote of the Board of Health, on the 23rd of October, the Consulting Physicians were requested to prepare a report, giving a history of the small-pox epidemic in Lowell and the means employed to eradicate the disease.

That report has been prepared with much care, and will, we think, be found a valuable sanitary document. It goes so fully into the origin, progress and decline of the disease in our city, and the statistics are therein given in such detail, that we deem it unnecessary to incorporate them at length in this report, but beg to refer to the accompanying report of the Consulting Physicians.

Respectfully submitted.

FREDERICK AYER,	} Board of Health.
HENRY C. HOWE,	
BENJ. WALKER,	
H. C. CHURCH,	
ABEL T. ATHERTON,	

LOWELL, MASS., November 28th, 1871.

THE SMALL-POX EPIDEMIC IN LOWELL.

At a meeting, October 30th, of the Consulting Physicians, the undersigned were appointed a Committee to prepare a Report upon the small-pox epidemic, in compliance with a request from the Board of Health; and the following report having been prepared, was unanimously adopted by the Consulting Physicians, November 27th, and is herewith transmitted to the Board of Health.

NATHAN ALLEN,
GILMAN KIMBALL,
J. W. GRAVES.

ITS HISTORY AND EXTENT.

There appears to be some uncertainty respecting the origin of this disease in our city. It made its first appearance in a family by the name of Kennedy, on Mill Street, in January last. This family, with the exception of the father, who had been a resident of Lowell some six months previous, arrived in Boston from Liverpool and came directly to Lowell. This family were all in apparent good health, and no contagious disease was known to exist in the vessel in which they came over. Furthermore, all the family had been vaccinated in England. Some two weeks after their arrival, a girl, eight years of age, was taken ill with an eruptive disease, which was supposed to be scarlet fever. Ten days after, a boy, three and a half years of age, was taken sick and died on the 29th of January. His death was reported as caused by scarlet fever. No physician had been in attendance, and no small-pox was suspected until some days after his burial.

At this time a child living near by was taken sick, and a suspicion arose that it might be a case of small-pox. The proper authorities were notified, an investigation was made, and the case was found to be one of small-pox. The Kennedy girl had at this time the eruption remaining on her face, which still

bears the distinctive marks of the disease. The presumption at first would seem to be, that the disease was contracted on her passage, or on her arrival in Boston; but another and more probable interpretation of it is, that it was contracted through the use of a second-hand mattress, which had been bought at auction, just before the arrival of this family, and which had every appearance of having had hard service. Both the Kennedy children slept on this mattress. No other cases occurred at the time in the neighborhood, but the disease soon appeared in a number of other and distant localities. The City Physician reported on the 10th of April that thirty-five cases had then come to his knowledge. From this date to May 16th we are unable to obtain the exact number of new cases, but judge there may have been from fifteen to twenty. On the 16th of May a record was commenced at the City Marshal's office. This record shows as follows: From May 16th to June 1st, twenty-one cases; in the month of June, thirty-two cases; in July, sixty-one cases; in August, ninety-three cases; and from September 1st to the 24th, one hundred and forty-three cases, when this record closes.

The account then continues as follows, under the new Board of Health: From September 24th to October 1st, we find sixty-nine cases reported, making a total of two hundred and twelve in the month of September. From October 1st to November 1st, ninety-four cases; since that date, six cases. This comprises in the aggregate five hundred and seventy cases, but this by no means includes the whole number growing out of the epidemic. During the season many persons in the city had slight attacks of varioloid and even small-pox, with more or less eruption, which cases, either through ignorance or intention, were never reported. At three different times it has been directly communicated to the State Almshouse in Tewksbury, where thirty of its inmates were attacked with the disease; and in five or six of the neighboring towns nearly thirty cases of varioloid or small-pox have occurred, during the season, which are traceable directly to our city. The disease has also broken out in Maine, New Hampshire, Vermont and Rhode Island, in each of which States it is alleged that the infection was brought from Lowell.

The number of deaths from this disease corresponds with the spread of the epidemic. The first death reported from small-pox occurred February 20th, the patient being a child under two years of age. The first death actually occurring and reported as scarlet fever, took place January 29th. The report of the Superintendent of Burials gives the following record of deaths from small-pox: March, four; April, six; May, seventeen; June, eight; July, twenty-two; August, twenty-nine; September, fifty-five; October, thirty, and November, one; making in all, one hundred and seventy-two. To this should be added five or six deaths, reported under the name of other diseases, which are well known to have been caused primarily, if not wholly, by this epidemic. Then we should add to this list the number of deaths occasioned by the communication of this disease in other places. In this class some fifteen deaths can be traced, including ten in the State Almshouse, at Tewksbury. This brings the whole mortality up to one hundred and ninety-two persons, of all ages and conditions, but the great majority of deaths were among the young. There were only eight over 50 years of age, and the number between 30 and 50 was not large; whereas there were thirty-one deaths of infants under 1 year, forty-seven children between 1 and 5, fifty-two persons between 5 and 20, and forty-two between 20 and 30. These

statistics show that the great majority of those dying of small-pox were either young or in the prime of life, and that they were not so well protected by vaccination, or at that age are more susceptible to the disease. This also harmonizes with the general fact that eruptive diseases are more common with the young than with the middle-aged or the more advanced in life.

MEANS EMPLOYED TO ERADICATE THE DISEASE, (BY THE OLD
BOARD OF HEALTH.)

Early in February, when the small-pox was first discovered, an effort was made by the Board of Health to place the infected district under quarantine, by hanging out the red flag, by barricading the streets, and by preventing communication with the district. But in a short time the disease appeared in so many new localities, that all attempt at isolation was abandoned. Where parties would tolerate its appearance, the red flag became the signal of the existence of the disease, and at the same time, almost the only barrier to its extension. Physicians were notified by the Board of Health to comply with the law in reporting all cases of small-pox or varioloid coming under their observation, and a record of the same was kept at the City Marshal's office, after the middle of May.

On the 10th of April the Board of Health ordered a general vaccination throughout the city under the direction of the City Physician. There were vaccinated at this time about eight thousand persons, and during the summer, about one thousand more. As the small-pox steadily increased, efforts were made by the Board, the City Physician and City Marshal, to induce persons attacked with the disease to be removed to the hospital provided by the city. But few would consent to such removal, and the Board of Health considered that they had no right, or legal power, to cause such removals.

At sundry times the public were assured by official authority, that the number of cases of small-pox in the city was very limited, and the expectation was held out that the epidemic would soon come to an end.

ACTION OF THE MEDICAL SOCIETY.

On the 26th of July, at a regular meeting of the District Medical Society, the small-pox epidemic came up for discussion, under a resolution setting forth that no Board of Health could be properly constituted without a representation in the same by one or more members of the medical profession, and that the orders emanating from such a Board, as well as the laws upon sanitary measures, would be most efficiently executed by their coöperation. It was generally conceded by the physicians present at this meeting, that the small-pox, at that time, was actually on the increase in the city. Some members thought the profession had been unjustly censured by the public, for doing no more to check the progress of the disease, while others were sure that their advice and counsels, with reference to suppressing the epidemic, were wholly ignored by those having charge of this most important department of the public welfare. The opinion was very generally expressed at this meeting that by proper measures this epidemic could be suppressed in a short time; and with the desire of having some

efficient measures taken in this direction, the following resolution was unanimously passed:

"That in view of the present condition of our city, in regard to the prevalence of small-pox, we, as members of the medical profession, respectfully suggest that, in our opinion, in order to effectually suppress or control the disease referred to, a distinct commission should be created by the City Government, whose exclusive duty it should be, so long as may be necessary, to do all in their power, by proper and legal means, to get rid of the disease now existing in our midst."

By some inadvertence this resolution was addressed to the City Council, when it was intended for the Board of Health and was delivered to its chairman. Whatever may have been its reception in this Board, or its results in the action of the City Government, it was certainly dictated and adopted, on the part of the medical fraternity, after much discussion, with the kindest spirit and best of wishes. This resolution was presented immediately to the Board of Health which, (after determining that it had no power to make such changes,) transmitted the same to the City Council at its meeting, September 12th, a lapse of nearly six weeks intervening. After considerable discussion in the Council, this resolution was referred to a committee to consider and report upon; at an adjourned meeting, September 15th. This committee made a report to the City Council, introducing a new ordinance, providing for a temporary health commission, consisting of six persons—one from each Ward—with particular reference to the removal of the small-pox. But as it was thought by some that the operation of such a commission might conflict with the action of the Board of Health, another ordinance, with some changes, was proposed and adopted, which virtually displaced the old Board and led to the establishment of the new one. In the meantime the agitation of the subject, in the community, resulted in petitions to the City Government, extensively signed, urging them to take immediate measures for checking the progress of the disease. Thus the action taken by the Medical Society became, unexpectedly, the occasion of an important change in the City Council.

NEW BOARD OF HEALTH.

Up to the time of the election of the present Board of Health, the small-pox had materially increased and was then prevailing more than ever. From the 15th of September (the date on which the new Board was elected) to the 22nd, one week, seventy-eight new cases were reported. There must have been in the city at this time, outside of the hospitals, considerably more than one hundred cases, and the number was increasing at the rate of ten daily, on an average. The Board of Health organized September 18th and at once appointed a Board of Consulting Physicians to coöperate with it, the latter taking the medical part of the business in charge. Both bodies commenced work in earnest, meeting three times daily. Provision was made for a thorough course of vaccination and re-vaccination throughout the city, under the law requiring it once in five years. Under their direction fourteen thousand nine hundred and forty-one persons were vaccinated and re-vaccinated. In addition to these, the City Physician was vaccinating during the same period.

ISOLATION,

or removal of all cases of small-pox and varioloid from the city, was another cardinal principle recommended by the Consulting Physicians, and adopted by the Board of Health. As the hospital provided for small-pox, by the city, was immediately filled, another building was commenced, and in a short time two additions were made to the same. As fast as accommodations could be provided, cases were removed, so that in ten or twelve days it contained nearly one hundred patients, including all that were in a condition to be removed. This complete isolation was considered of the first importance in checking the disease. A thorough system of fumigating, cleansing and ventilating all rooms and dwellings where cases of small-pox or varioloid had been known to exist, was adopted. Signals, by means of a red flag by day, and a red light by night, were employed to designate localities where the disease existed. Police officers were also stationed at such places, to prevent communication and exposure, and the public was recommended not to frequent infected districts, and to avoid public gatherings, places of amusement, &c. A recurrence to the figures will at once show the effect of these agencies in arresting the progress of this disease. According to the best estimate made there were over forty cases in February, March, and April; in May there were twenty-one cases, June thirty-two, July sixty-one, August ninety-three, September two hundred and twelve, and in October ninety-four. But a weekly report for the months of September and October will exhibit the change more correctly, both as to increase and decrease. The first week in September there were twelve cases, second week forty-two, third week seventy-eight, fourth week sixty-six; first week in October fifty-three, second week twenty-four, third week twelve, fourth week seven, and first week in November one. Isolation of cases was commenced on the 19th of September, but could not be made complete, for want of the necessary room, until about the 25th of September; hence the best effects could not be seen until the second and third week in October, allowing fourteen days for the disease to develop, after the exposure. The third week in September showed seventy-eight cases; the second week in October twenty-four; the last week in September sixty-six; and the third in October twelve. Nearly all the cases occurring since, can be traced directly to the exposure from some previous case.

SMALL-POX HOSPITAL.

This building is located on the grounds of the city, about fifty rods from the Almshouse. The first case was removed there February 14th. The admissions afterwards were as follows: March, two; April, five; May, five; June, three; July, thirteen; August, fifteen; September, twenty-five; up to the commencement of the new Board of Health.

Dr. A. W. Buttrick was appointed resident physician at the hospital. One or more of the Consulting Physicians visited the hospital daily. From the above it will be seen that from February 14th to September 19th, there were sixty-seven inmates at the hospital, of which number nineteen died, making a rate of mortality of one in three and fifty-three hundredths. From September 19th to October 1st, sixty patients were admitted, nineteen being carried there in one day, the

27th. From October 1st to November 1st, ninety-two cases were admitted, commencing with forty-three the first week, and closing the month with nine for the last week. The first week in November only one case was sent. The greatest number at any one time was ninety-two. Of the one hundred and fifty-two persons admitted from September 19th to November 7th, thirty-two have died, making the rate of mortality one in four and seventy-five hundredths. The whole number of cases taken to the hospital, from the commencement of the epidemic, was two-hundred and twenty-six.

CORPORATION HOSPITAL.

The whole number of cases taken to this hospital was fifty-four, of which eleven died, making the rate of mortality one in five, minus a small fraction. All but five of these patients came from the corporations. This institution, now under the charge of Dr. J. W. Graves, proved an important auxiliary to other means, in limiting the spread of the disease. As on other similar occasions in past years, its wards have been thrown immediately open to any case that appeared among the operatives. The benefits derived from this arrangement have never been more marked than in connection with this recent epidemic.

MORTALITY OUTSIDE THE HOSPITALS.

The whole number of patients removed to the hospitals was two hundred and seventy-four, leaving two hundred and ninety-three cases reported outside. The number of deaths in the hospitals was sixty-two, making the rate of mortality nearly one in four and forty-six hundredths; but one hundred and ten deaths outside makes the rate of mortality about twice as large. In extenuation of this fact, it may be stated that some of the patients who died were too sick to be removed, but after making all due allowance, the facts present an argument in favor of the more successful treatment at the hospitals.

LEGAL MEASURES EMPLOYED.

For the purpose of more speedily and effectually eradicating the small-pox from our city, it became indispensable, in some instances, for the Board of Health to resort to legal measures for the enforcement of vaccination, removals, and in some instances reports of cases which were being concealed. The Board acted successfully under the following sections, which we quote from the General Statutes of our Commonwealth, and in which they found full powers to meet the emergency. They are as follows:

ABSTRACTS OF LAWS OF THE COMMONWEALTH RELATING TO HEALTH.

"Two Justices of the Peace may, if need be, issue a warrant directed to the Sheriff, his Deputy, or any Constable, requiring them, under the direction of the Board, to remove any person infected with contagious sickness, or to impress and take up convenient houses, lodging, nurses, attendants, and other necessities, for the accommodation, safety and relief of the sick.

"When a householder knows that a person within his family is taken sick of small-pox, or any other disease dangerous to the public health, and shall neglect to give immediate notice thereof to the Board of Health, he shall forfeit a sum not exceeding one hundred dollars.

"When a physician knows that any person whom he is called to visit is infected with small-pox, or any other disease dangerous to the public health, and refuses or neglects to give immediate notice thereof to the Board of Health, he shall forfeit for each offence a sum not less than fifty nor more than one hundred dollars.

"Parents and guardians who neglect to cause their children or wards to be vaccinated before they attain the age of two years, and re-vaccinated after five years from the last vaccination, and all persons over twenty-one years of age, not under guardianship, who neglect to be vaccinated, shall forfeit the sum of five dollars.

"The Board of Health may notify occupants of unfit dwelling-houses, requiring the premises to be properly cleansed, and if they see fit, the occupants to remove therefrom as soon as the Board of Health may prescribe; and any person who occupies or knowingly permits any premises to be occupied after having been cleansed, without permission in writing from the Board of Health, shall forfeit a sum not less than ten dollars nor more than fifty dollars.

"For every neglect of the owner or occupant of private property to remove filth or cause of sickness found on his premises within twenty-four hours, or such other time as the Board deem reasonable, after notice shall have been served, he shall forfeit the sum of twenty dollars for every day during which he permits such nuisance or cause of sickness to remain after the time prescribed for the removal thereof, and the Board of Health may cause the nuisance or cause of sickness to be removed at the expense of the owner or occupant.

"Whoever violates any regulation made by the Board of Health for the public health and safety, respecting nuisances, sources of filth and causes of sickness, and respecting articles which are capable of containing or conveying infection or contagion, or of creating sickness, brought into or conveyed from the city, shall forfeit a sum not exceeding one hundred dollars.

"When, upon the application of the Board of Health, it appears to a Justice of the Peace that there is cause to suspect that any baggage, clothing, or goods, found within the town, are infected with the plague, or other disease, which may be dangerous to the public health, the Justice shall, by warrant, directed to the Sheriff or his Deputy, or to any Constable, require him to impress so many men as said Justice may judge necessary, to secure such baggage, clothing, or other goods, and to post said men as a guard over the house or place where such articles are lodged. The officers, in the execution of the warrant, shall, if need be, break open any house, shop, or other place, mentioned in the warrant, where such articles are, and may require such aid as is necessary to effect the execution of the warrant."

THE COMPARATIVE RESULTS OF THE AGENCIES EMPLOYED.

Our experience in dealing with the present epidemic compels us to place isolation before vaccination. The latter has not seemed to afford that protection which has usually been ascribed to it. At particular stages of the epidemic this agency did not arrest the progress of the disease as was expected. Neither in individual cases, has it prevented persons, apparently well vaccinated, from having a violent, and in several instances, a fatal attack of the small-pox. A careful examination of quite a number of very grave cases, at the hospitals, distinctly showed marked cicatrices—some large, well-pitted, and made, as the patients said, by inoculation for the small-pox itself, or by virus from the cow.

pox. Still, there were other patients where the disease was much modified — rendered lighter in form, or shorter in duration — by the effects of vaccination. Then, in many instances, where individuals (including several infants) were subjected to the greatest exposure, and had recently been successfully vaccinated, they were perfectly protected. But the most striking proof of the protection of vaccination has been found on the Corporations. Under the direction of their agents, a more systematic and thorough course of vaccination has been pursued among the operatives, and others connected with the Mills, than elsewhere in our city. The rule has always been to remove every case of small-pox or varioloid to the Corporation Hospital as soon as discovered. From the commencement of this epidemic in February, only forty-nine persons have been taken to the Corporation Hospital from the mills or boarding-houses, and in no instance have other parties, exposed at the time, taken the disease. Twenty of these forty-nine were female operatives, and only two died. It is true, however, that some operatives not boarding in the Corporation boarding-houses have been carried to the City Hospital, and others, prior to September 25th, have had the disease at their own homes, but this number is not large. As those connected, in some way, with the mills, comprise one-third or more of the population of the city, the proportionate number sick with small-pox or varioloid from this class has been, relatively, very small.

It may be said that the uniform and prompt removal of all cases of small-pox and varioloid from the Corporations, also favors the doctrine of isolation, which is true. Another argument in favor of vaccination, however, may be deduced from the fact that very few school-children had the disease, the rule for admission requiring evidence of vaccination always having been rigidly enforced. While, therefore, we are constrained to place isolation as the more successful agency in arresting the epidemic, we would by no means undervalue the importance of vaccination, when *properly performed*.

Of two things we are more fully convinced than ever — 1st, of the frequent imperfection of this operation, either in the manner of doing it, or of some defect in the virus used; and 2nd, in the absolute necessity of *re-vaccination*. This is indispensable. Let us adopt either of the two theories on vaccination — 1st, that its protective power gradually diminishes with the changes taking place in the human body, and therefore, to test its continuance, re-vaccination becomes occasionally necessary; or the other theory, that frequently the first vaccination may not be complete, and therefore it should soon be repeated and continued until it produces no effect. Then its protective power continues for life.

Complete isolation was regarded, in the outset, as an indispensable measure, and experience has shown that this could only be accomplished by removal to the Hospitals.

By recurring to the rapid decline of the epidemic, from September 25th to October 25th, it will be seen how quickly the removal of cases arrested the disease, reducing the number from seventy-eight in the third week of September, to twelve in the third week of October, and to one only for the second week after that. The decrease in the number of deaths shows this sudden decline in a more striking manner. It should be borne in mind that removals were not fully made and isolation rendered complete, until the last of September. In that month there were fifty-five deaths; in the first half of October, twenty-three; last half, seven, and only one, thus far, in November. It is true that, whenever

a case was removed, the members of the family and all others, in any way exposed, were at once re-vaccinated. Besides this, as has been stated, such premises were promptly fumigated, and such clothing, bedding, &c., as could not be disinfected, was destroyed. To such an extent was this preventive treatment carried, that even the vaults connected with dwellings where cases of small-pox and varioloid had existed, were disinfected under the direction of an experienced chemist. Thus, by these means, this terrible epidemic, attacking over two hundred persons in one month, and causing fifty-five deaths in the same time, has been almost entirely eradicated in a little more than six weeks. This demonstrates what skill and science can do, sustained by wise management and efficient action.

SUGGESTIONS.

This sad record of disease and mortality has its lessons of admonition and instruction. When this epidemic first made its appearance, our people were, unfortunately, but poorly protected against its ravages. There had been no general vaccination, by official authority, for six or seven years, and, in the meantime, an entire change had taken place in nearly one-third of our inhabitants. Besides, the mixed character of our population, composed as it is largely of young persons, renders it more necessary that a thorough course of vaccination, by official order, should be resorted to frequently, as a safeguard against the disease. Again, our Boards of Health, as usually constituted, are not chosen with any particular reference to special qualifications to insure intelligent and efficient action—are changed almost entirely every year; and no compensation is allowed for services thus rendered. The medical profession, as such, has not been represented upon this Board for many years, and even the City Physician is not a member of it. We have a superintendent of streets, of buildings, of city scales, and of *burials*, but no superintendent of public health. Had our city been provided with such an officer, or had the advice of some of our oldest and most experienced physicians been followed, at the time, we believe the present epidemic would have been suppressed in its incipient stages. The city expends money liberally, every year, to protect property and make improvements of various kinds, but nowhere do we find any appropriation directly for the prevention of disease, or the preservation of human life. No small amount of sickness and mortality occurs here every year, caused by nuisances and various other sources, which might easily be prevented by the proper employment of hygienic and other agencies. The City Physician and City Marshal are, to be sure, charged in the ordinances with certain health duties, but they always have enough else to engage their time and attention, and neither is chosen with any special reference to qualifications in this particular department of public service. Neither can it be expected that such important duties will be properly performed, under a sense of personal responsibility to the public, without the appointment of suitable officers, accompanied with an adequate compensation.

How frequently, of late, has the whole community been shocked by the loss of life, in the fall of some building, some railroad disaster, explosion, or by the wreck of some vessel at sea, but here in our midst, this very year, have the lives of one hundred and seventy-five individuals been quietly sacrificed, which,

apparently, might and ought to have been saved! Shall we not profit by such sad experience in the past, and ought we not now to prepare for another great epidemic, with which our country is seriously threatened the coming year. Let the suggestion be seasonably heeded.

We cannot close this report without expressing, in behalf of the public, the great obligations due the Board of Health, for its prompt and energetic action, in co-operating with the Consulting Physicians in suppressing the epidemic.

INSTRUCTIONS

FOR CONTROLLING SMALL-POX CONTAGION,

ADOPTED BY THE BOARD OF HEALTH, OF THE CITY
OF LOWELL, MASS.

ISOLATION.

1. Persons attacked with small-pox or varioloid, and all infected clothing of the same, must be immediately separated from all other persons liable to contract or communicate the disease.
2. Nurses and the infected clothing of such persons must be treated as in quarantine.
4. None but nurses, and the attending physicians, will be allowed access to persons sick with small-pox or varioloid.
3. Patients must not leave the premises until they, together with the bedding and clothing, have been disinfected, and permission given by some Physician of the Board of Health.

DISINFECTION.

1. All bedding and personal clothing infected with the small-pox contagion, which can without injury, must be washed in boiling water.
2. Infected feather-beds, pillows, and hair mattresses, must have contents taken out and thoroughly fumigated, and ticks washed in boiling water.
3. Infected straw and excelsior mattresses must have contents removed and buried, and ticks washed in boiling water.
4. Infected blankets, sheets and pillow-cases, and all articles in contact with, or used by the patient, must be washed in boiling water.
5. Personal clothing and bedding, particularly comforters, which cannot be wet without injury, must be disinfected by baking or by fumigation.
6. Instead of using boiling water as the disinfectant, the following chemical process with cold water may sometimes be conveniently substituted: Dissolve in a wash-tub, containing eight gallons of cold water, one pound of the hyposulphite of soda, immerse all the articles of clothing and bedding used by or around the patient, and when thoroughly saturated add half a pint of sulphuric acid, first diluting it with one gallon of water; stir the whole and allow the clothes to soak an hour, then wring them out, rinse three times in cold water, and hang out to dry.
7. Disinfection of houses, clothing and bedding by fumigation may be effected by filling the closed rooms with the fumes of sulphurous acid, or chlorine gas. The first can be accomplished by putting half a pound of sulphur in an iron dish, pouring on a little alcohol and igniting it, thereby causing the sulphur to burn and give off sulphu-

rous acid fumes. The second can be accomplished by moistening with water four pounds of chloride of lime, contained in an earthen or wooden vessel, and adding thereto a pint of muriatic acid, to liberate the chlorine gas. Clothing and bedding, to be well fumigated, must be separated as much as possible, and hung upon the walls and furniture of the room, so that everything will be thoroughly permeated. The rooms should be kept closed an hour or two after being charged with gas by either method, and then thoroughly ventilated. No attempt should be made to fumigate the sick-room in this manner, while it is occupied by the patient.

8. On the recovery, removal or death of every case of small-pox or varioloid, the clothing, bedding, and premises will be disinfected, in accordance with the above rules, under the direction of one or more physicians employed for the purpose by the Board of Health.

9. The physicians employed in disinfecting may cause the removal, destruction, or burial of such infected bedding and clothing as may, in their judgment, seem to require it, of which they shall keep a correct record, with date, kind of article, whether new or old, estimated value, name and residence of the owner. No person shall burn any contaminated articles unless authorized by the Board of Health.

10. The sick-room should be kept well ventilated, with such precautions as not to expose the patient to direct currents of air, and should be occasionally fumigated, slightly, by throwing upon a heated surface a few teaspoonfuls of a *solution of carbolic acid*, made by dissolving one ounce of crystalized carbolic acid in a quart of rain water. Pieces of cloth may be soaked in this solution, and suspended in the room, also in the hallways adjoining. All vessels for receiving discharges of any kind from patients, must be emptied immediately after use, and cleansed with boiling water. When convalescence has taken place, the patient must be thoroughly washed in warm water and soap, and put on fresh, clean clothes throughout.

11. Privies, water-closets, garbage-tubs, water-pipes, and all kinds of drains and foul places in houses, stables, and yards, may be disinfected with a solution made as follows. Dissolve eight pounds of copperas (sulphate of iron) in five gallons of water, add one quart of the solution of carbolic acid, and mix well.

12. It should be remembered that there are no substitutes for pure air and water. Let fresh air and sunlight purify every place they can reach; open and dry all cellars; keep the grounds about dwellings dry and clean, and let personal and domestic cleanliness be everywhere observed.

VACCINATION,

and re-vaccination, is of paramount importance, affording the best attainable protection against small-pox, and mitigating its severity when not preventing an attack.

Voted, That we recommend the foregoing instructions, prepared by the committee, consisting of Dr. J. W. Graves, Chairman, and Dr. J. H. Gilman, Secretary, be adopted by the Board of Health.

JOHN W. GRAVES, GILMAN KIMBALL, NATHAN ALLEN, WALTER BURNHAM, HIRAM PARKER, FRANCIS C. PLUNKETT, JOHN H. GILMAN,	} Consulting Physicians to Board of Health.
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Voted, That the foregoing instructions, recommended by the Board of Consulting Physicians, and adopted by this Board, be printed for general distribution.

FREDERICK AYER, H. C. HOWE, BENJ. WALKER, H. C. CHURCH, ABEL T. ATHERTON,	} Board of Health.
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October, 1871.

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